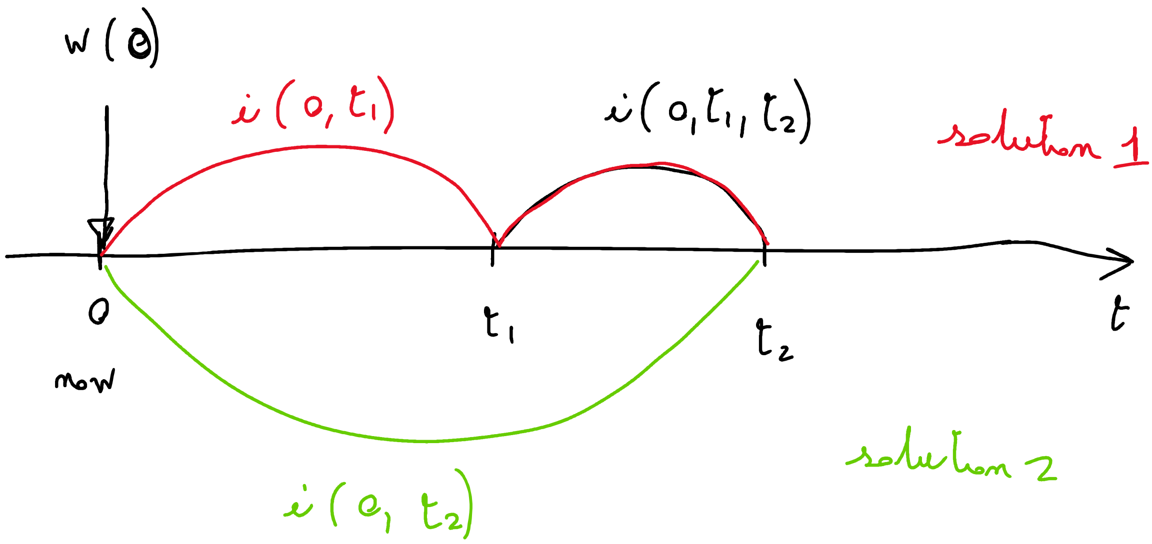
$$i(0, t_1, t_2) \quad \text{with} \quad t_1 < t_2$$



solution 1

$$w(0)\,(1 + i(0,t_1))^{t_1}\,(1 + i(0, t_1, t_2))^{t_2 - t_1}$$

solution 2:

$$w(0)\,(1 + i(0, t_2))^{t_2}$$

$$\cancel{w(0)}\,(1 + i(0,t_1))^{t_1}\,(1 + i(0, t_1, t_2))^{t_2 - t_1} = \cancel{w(0)}\,(1 + i(0, t_2))^{t_2}$$

$$\frac{\cancel{(1 + i(0, t_1))^{t_1}}\;\overset{?}{(1 + i(0, t_1, t_2))^{t_2 - t_1}}}{\ldots} = \frac{(1 + i(0, t_2))^{t_2}}{\ldots}$$

$$\cancel{\frac{\qquad}{(1+i(0,t_1))^{t_1}}} = \frac{(1+i(0,t_2))}{(1+i(0,t_1))^{t_1}}$$

?

$$\left(1+i(0,t_1,t_2)\right)^{t_2-t_1} = \frac{(1+i(0,t_2))^{t_2}}{(1+i(0,t_1))^{t_1}}$$

$$x^2 = 3$$

$$\left[\left(1+i(0,t_1,t_2)\right)^{\cancel{t_2-t_1}}\right]^{\frac{1}{\cancel{t_2-t_1}}} = \left[\frac{(1+i(0,t_2))^{t_2}}{(1+i(0,t_1))^{t_1}}\right]^{\frac{1}{t_2-t_1}}$$

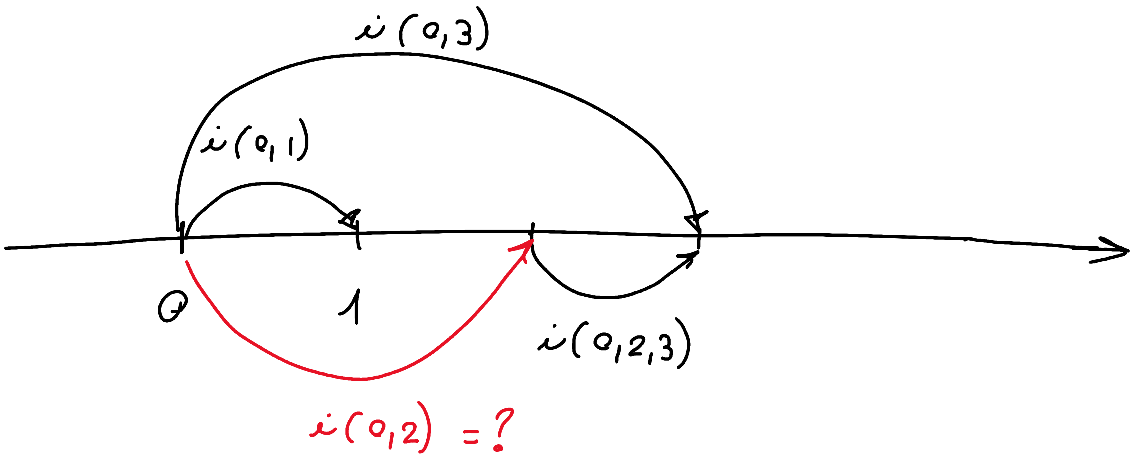
$$1+i(0,t_1,t_2) = \left[\frac{(1+i(0,t_2))^{t_2}}{(1+i(0,t_1))^{t_1}}\right]^{\frac{1}{t_2-t_1}}$$

$$i(0,t_1,t_2) \quad \left[(1+i(0,t_2))^{t_2} \right]^{\frac{1}{t_2-t_1}}$$

$$i(0,t_1,t_2) = \left[\frac{(1+i(0,t_2))^{t_2}}{(1+i(0,t_1))^{t_1}}\right]^{t_2-t_1} - 1$$

EX30: Let be given i(0,1)=0.075, i(0,2,3)=0.035, i(0,3)=0.05.

The term structure of the spot rates of interest can be obtained.



$$\cancel{W(0)}\,(1+i(0,3))^3 = \cancel{W(0)}\,(1+i(0,2))^2\,(1+i(0,2,3))^1$$

?

$$(1+i(0,2))^2 = \frac{(1+i(0,3))^3}{1+i(0,2,3)}$$

$$i(0,2) = \sqrt{\frac{(1+i(0,3))^3}{1+i(0,2,3)}} - 1 =$$

$$= \sqrt{\frac{(1+0.05)^3}{1+0.035}} - 1 \cong 0.0576$$

$$= \sqrt{\frac{(1+0.05)^3}{1+0.035}} - 1 \cong 0.0576$$

```
>> sqrt((1 + .05)^3/(1 + .035)) - 1

ans =

    0.0576

>>
```

2. In Matlab:

- Store in the array v the multiples of 4 between 8 and 24
- Remove the last element of v and store the result again in the array v
- Store in the array $v1$ the first half of v and in the array $v2$ the second half of v
- Create the matrix A having the arrays $v1$ and $v2$ as rows
- Divide all the elements of the matrix A by 4 and store the result again in A
- Subtract 2 from all the elements of the matrix A and store the result again in A
- Let $f(x) = x\cos(x)$ and $g(x) = \sqrt{x} - \ln(1+x)$. Make a plot in the same figure of f and g (possibly with different colors and labels along the axis) with x ranging from 0 to 20
- Compute $f(A)$ and store the result in the matrix B
- Compute $g(A)$ and store the result in the matrix C
- Can we compute $B + C^T$? If so, store the result in the matrix D.

```
>> u = 10:-2:-3

u =

    10     8     6     4     2     0    -2

>>
```

u	10	8	6	4	2	0	-2
	1	2	3	4	5	6	7

w	8	4	0

w = u([2 4 6])

```
>> u = 10:-2:-3

u =

    10     8     6     4     2     0    -2

>> w = u([2 4 6])

w =

     8     4     0
```

```
clc, clear all
v = 8:4:24
v(end) = []
%v1 = v(1:2) or
v1 = v([1 2])
v2 = v(3:4)
A = [v1; v2]
A = 1/4*A       % This is a comment
```

```
A =

2    3
4    5
```

$\frac{1}{4} \underline{\underline{A}}$

$$\underline{\underline{A}} := \underline{\underline{A}} - \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} - \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$$